REMARKS/ARGUMENTS

Bearing in mind the comments of the final Official Action, the application has been amended so as to place it in condition for allowance. An early indication of the same would be appreciated.

Claims 1-67 remain pending in this application. Claims 1, 37, 51, 57, and 62 are independent. Claims 1, 37, and 51 were amended for clarity and specifically not to overcome any art of record, and claims 57 and 62 have been amended into independent form, in reliance upon the indication of allowable subject matter. Dependent claim 59 was amended to correct an obvious error in dependency from claim 1 to claim 58, to ensure that proper antecedent basis is provided. No new matter is involved with any claim amendment.

Attached hereto is a marked-up version of the changes made to the claims by this amendment.

Indefiniteness Rejections

Withdrawal of the rejection of claims 1, 37, and 51 under 35 U.S.C. §112, second paragraph, as being indefinite, is requested. Responsive to the Examiner's comments in the final Official Action, these claims have been amended solely for clarity, and specifically not to overcome any art of record.

The Examiner correctly points out that applicants disclose, as described in the Specification and Drawings, use of bar code indicia in at least one embodiment. However, the undersigned points out that this embodiment is not presently claimed, and is not required to be claimed. Independent claims 1, 37, and 51 specifically and positively claim, as disclosed in various forms, an information providing pattern ***other than a bar code pattern***, or a digital form ***other than a bar code pattern***.

Further, as the Board of Patent Appeals and Interferences has stated, "[i]n rejecting the claim under the second paragraph of 35 U.S.C. § 112, it is incumbent on the Examiner to establish that one of ordinary skill in the pertinent art, when reading the claims in the light of the

supporting specification, would not have been able to ascertain with a reasonable degree of precision and particularity in the particular area as set out and circumscribed by the claims.[1]

Applicants respectfully suggest that a person of ordinary skill in the art would not have been confused by the recitations of an "information providing pattern ***other than a bar code pattern***," or "a digital form ***other than a bar code pattern***", certainly, at least, in this art, and with the knowledge which would be gained by study of Applicants' disclosure. These recitations clearly indicate that the claimed invention is directed to markings which exclude bar code patterns.

Applicants disagree with the Examiner's contention that a "digital information-providing pattern" can be used interchangeably with the term "bar code pattern". Bar code patterns have a specific and known meaning in the art. For example, a bar code pattern is commonly known as a combination of narrow bars, narrow spaces, wide bars, and wide spaces, which are known and used as indicia for identification in labeling, warehousing, merchandising, etc., and which typically exhibit code densities, i.e., numbers of characters per inch ranging from 3 to about 10. The bar code characters are typically arranged in a known format, e.g., bar code "39" or "3-of-9", which makes use of nine elements per character. Bar codes are not used to represent binary "0" or "1".

A digital information providing pattern, on the other hand, should be much more differently interpreted, to broadly include binary, hexadecimal, quaternary, ASCII, etc., possibly represented by a variety of arrangements, e.g., circular or elliptical/oval pits, elongated slots in various arrangements and relative orientations, for example.

In consideration of the above, and coupled with the specifically recited ***exclusion*** of bar code patterns, there should be no reason to believe that a "digital information-providing pattern" could be used interchangeably with the term "bar code pattern".

Therefore, withdrawal of the indefiniteness rejections is respectfully requested.

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[1] *Ex Parte Wu*, 10 U.S.P.Q.2d 2031, 2033, (BPAI 1988).

Anticipation Rejections

Withdrawal of the rejection of claims 1, 2, 6, 9, 13, 22, 37, 40, 43-45, 51, 54, 55, 58, 60, 63, and 64 under 35 U.S.C. §102(e) as being anticipated by Bacchi et al. (US 5,894,348) is requested.

Applicants note that anticipation requires the disclosure, in a prior art reference, of each and every limitation as set forth in the claims.[2] There must be no difference between the claimed invention and reference disclosure for an anticipation rejection under 35 U.S.C. §102.[3] To properly anticipate a claim, the reference must teach every element of the claim.[4] "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference".[5] "The identical invention must be shown in as complete detail as is contained in the ...claim."[6] In determining anticipation, no claim limitation may be ignored.[7] In view of the foregoing authority, the cited reference at least fails to anticipate independent claims 1, 37, and 51 as originally presented, and as amended.

Bacchi et al. does not disclose a semiconductor wafer, which includes, among other features, "a plurality of pits...arranged in a digital information-providing pattern [which is] arranged and suitably adapted to be readable before, during and after completion of processing on the wafer", as recited in independent claim 1, as amended.

Further, Bacchi et al. clearly does not disclose a method of encoding information on a semiconductor wafer, which includes, among other features, "...forming pits suitable for being read before, during and after completion of processing on the wafer corresponding to the digital form of the information in the semiconductor wafer", as recited in independent claim 37, as amended.

Finally, Bacchi et al. clearly does not disclose a system for encoding information on a semiconductor wafer and reading the information, wherein the system includes, among other features, "...a plurality of pits formed...in a digital information-providing pattern...[which] is

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[2] *Titanium Metals Corp. v. Banner*, 227 USPQ 773 (Fed. Cir. 1985).
[3] *Scripps Clinic and Research Foundation v. Genentech, Inc.*, 18 USPQ2d 1001 (Fed. Cir. 1991).
[4] *See* MPEP § 2131.
[5] *Verdegaal Bros. v. Union Oil Co. of Calif.*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).
[6] *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).
[7] *Pac-Tex, Inc. v. Amerace Corp.*, 14 USPQ2d 187 (Fed. Cir. 1990).

adapted and arranged to be readable before, during and after completion of processing on the wafer...", as recited in independent claim 51, as amended.

Although Bacchi et al. is directed to a scribe mark reader which appears to disclose "means for ***reading*** the information encoded by the pits" (e.g., as found in claim 51), Bacchi et al. is silent on any teaching or suggestion of pits arranged and suitably adapted to be readable before, during, and after completion of processing on the wafer (claims 1 and 51), or the actual process step for ***forming*** pits suitable for being read before, during and after completion of processing on the wafer (claim 37).

Bacchi et al. is directed to a scribe mark reader which uses a combination of circularly polarized light and a holographic beam-shaping optical element to uniformly illuminate an area of a substrate that includes a scribe mark. By this arrangement, an image of the scribe mark can be formed even when the scribe mark's optical properties, e.g., coloration, reflectivity, or transmissivity, for example, are non-uniform, or otherwise degraded. Further, optical character recognition software is thereby allowed to work more efficiently by producing, in essence, an optical signal with a higher signal-to-noise ratio, in spite of the degraded circumstances of the scribe mark.

In other words, the scribe mark reader of Bachhi et al. overcomes and compensates for any deleterious change in optical properties of the scribe mark that may occur. Bacchi et al. is, in no way, associated with physically enhancing or forming the scribe mark or pits, in the manner specifically recited in Applicants' claimed invention.

Furthermore, Bacchi et al. appears to specifically disfavor such enhancement of the scribe marks or pits during formation due to the stated undesirability of the significant investment required by semiconductor manufacturers to improve or add additional process steps to improve the scribe readability. See col. 2, lines 34-36.

To summarize, Applicants' claimed invention and Bacchi et al. are complementary to each other, i.e., Bachhi et al. has invented a device which appear to be able to read an optical signal produced from the wafer marks of Applicants' invention, and which apparently also does an

admirable job of reading optical signals produced from non-enhanced pits or scribe marks, and even pits or scribe marks which have had their optical properties degraded to some extent.

Accordingly, as the applied art does not disclose all the recited features of at least the independent claims 1, 37, and 51, reconsideration and allowance of claims 1, 37, and 51 are requested.

Further, as dependent claims 2-36, 38-50, 52-56, 58-61, and 63-67 variously and ultimately depend from independent claims 1, 37, and 51 and, consequently incorporate their respective allowable features, these dependent claims are also submitted as being allowable at least on that basis, without recourse to the additional patentable limitations respectively recited.

Unpatentability Rejections

BACCHI ET AL. IN VIEW OF DUNCAN ET AL.

Withdrawal of the rejection of claims 7, 8, 10, 16, 21, 27-30, 33-35, and 38 under 35 U.S.C. §103(a) as being unpatentable over Bacchi et al. in view of Duncan et al. (US 4,585,931) is requested.

At the outset, Applicant notes that, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, ***the prior art reference must teach or suggest all the claim limitations*** (emphasis added).[8] Further, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure.[9]

An essential evidentiary component of an obviousness rejection is a teaching or suggestion or motivation to combine the prior art references.[10] Combining prior art references

[8] *See* MPEP §2143.
[9] *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) and *See* MPEP §2143.
[10] *C.R. Bard, Inc. v. M3 Systems, Inc.*, 48 USPQ2d 1225 (Fed. Cir. 1998)

without evidence of a suggestion, teaching or motivation simply takes the inventors' disclosure as a blueprint for piecing together the prior art to defeat patentability – the essence of hindsight.[11]

"There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art."[12] Further with regard to the level of skill of practitioners in the art, there is nothing in the statutes or the case law which makes "that which is within the capabilities of one skilled in the art" synonymous with obviousness.[13] The level of skill in the art cannot be relied upon to provide the suggestion to combine references.[14]

Applicants also point out that the Official Action lacks the requisite specificity with respect to identifying which particular features, of numerous dependent claim features, are disclosed by each reference, and at which column/line of the reference(s), and thus unnecessarily hinders an efficient and compact response to the Official Action.

Duncan et al. teaches away from at least one aspect of the claimed invention, and is submitted as not being properly combinable with Bacchi et al., as Examiner's asserted motivation to combine these references, i.e., "...in order to improve the readability of the information mark of the wafer by scattering the rays of light onto the surface of the wafer", is deficient on its face. While this particular motivating factor for combining references might be reasonable under completely different circumstances with respect to a method of ***reading*** encoded information from the surface of a wafer, neither independent claim 1, directed to a semiconductor wafer, nor independent claim 37, directed to a method of encoding information on a semiconductor wafer, claim or suggest any necessity of "scattering the rays of light onto the surface of the wafer", to improve the performance of an image reader and image readability.

Further, Applicants respectfully traverse the Examiner's assertion that the dependent claims which recite particular pit height/width and distance between the pits are obvious in view of the suggested combination of references, since "discovering the optimum or workable ranges involves only routine skill in the art."

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[11] *Interconnect Planning Corp. v. Feil*, 227 USPQ 543 (Fed. Cir. 1985)
[12] *See* MPEP §2143.01, citing *In re Rouffet*, 149 F.3d, 1350, 1357, 47 USPQ2d 1453, 1457-8 (Fed. Cir. 1998).
[13] *Ex parte Gerlach and Woerner*, 212 USPQ 471 (PTO Bd. App. 1980).
[14] *See* MPEP §2143.01, citing *Al-Site Corp. v. VSI Int'l Inc.*, 50 USPQ2d 1161 (Fed. Cir. 1999).

Applicants note, however, that the Official Action provides no basis for this statement (why to modify these parameters, and what parameters would be sought to be optimized) and, without more, simply concludes that the present invention would have been obvious in view of the suggested combination. However, applicant is not aware of any art that discloses a semiconductor wafer with these features, or a method which makes these modifications to the prior art dimensions. The Official Action's statement and conclusion, without more, is plainly not a sufficient factual basis on which to form any conclusion of obviousness.

If the making recited dimensional relationship is indeed an obvious modification, or if seeking to modify these particular parameters for the disclosed optimization was well known within the art, then citing art, which makes these disclosures, should not present any difficulty in a new, non-final action.

In fact, the recited dimensional relationships act, at least in part, to ensure the readability of the pits formed on the semiconductor wafer before, during, and after further processing steps.

In addition, the Official Action admits that neither Bacchi et al. nor Duncan et al. teaches that "the each space comprises 2 columns each comprising 32 pits", and that it would be an obvious design variation, and an obvious expedient. It is not clear which parameter or feature would be expedited, nor why, for example, the recitation of dependent claim 27, which depends from claims 1, 23, and 24, and which contains the recitation at issue, is an "obvious design variation".

When the entire chain of dependency of claim 27 is considered, this asserted "obvious design variation" seems particularly non-obvious. Claim 27 includes recitations of the pits being arranged in the back surface of the wafer, wherein groups of the pits have the shape of at least one of letters and numbers, and wherein each group of pits includes a machine-readable set of spaces for pits, each space comprising 2 columns each comprising 32 pits. Clearly, neither Bacchi et al. nor Duncan et al. teach or suggest these recited features.

As for the erroneous assertion of obvious design choice, in similar circumstances relating to claims to an apparatus, "[t]he BPAI held that appellant had simply made an obvious design choice. However, the different structures of appellant and of the reference achieve different

purposes."[15] Further, "[t]o require an applicant to include in his specification evidence and arguments regarding whether particular subject matter was a matter of 'design choice' would be tantamount to requiring the applicant to divine, before an application is filed, rejections the PTO will proffer. ***A finding of 'obvious design choice' is precluded where claimed structure and the function it performs are different from those of the prior art.***"[16] (emphasis added).

In this case, both the structure and the function performed by the claimed structure is different from the prior art.

The deficiencies of Bacchi et al. were discussed in connection with the anticipation rejection, above. Duncan et al. represents the conventional approach for identifying semiconductor wafers using bar code identification indicia, as discussed in the background section of the present Specification. Further, Duncan et al. is directed to a technique for solving a particular bar-code readability problem by widening the bar code aspect ratio. As also discussed at page 7 of the Specification, for example, bar codes on semiconductor wafers typically cannot be read after process steps have been completed, and use of bar codes for such semiconductor wafer identification is at least undesirable in this respect. Thus, Duncan et al. teaches away from at least one aspect of Applicants' ***claimed*** invention, as recited in independent claims 1, 37, and 51, as amended. Further, Duncan et al. clearly does not teach or suggest use of a digital information pattern, which is in the form of a pattern other than a bar code pattern. Therefore, Applicants submit that Duncan et al. is not properly combinable with Bacchi et al.

Even assuming, *arguendo*, that the references are properly combinable as suggested by the Examiner, an assumption with which applicants strongly disagree, as discussed above, Duncan et al. does not make up for the previously identified deficiencies of Bacchi et al., as discussed above with respect to independent claims 1 and 37. Thus, the applied art, taken alone or in combination, does not teach or suggest all the recited features of independent claims 1 and 37, from which these dependent claim variously and ultimately depend. Reconsideration and allowance of claims 7, 8, 10, 16, 21, 27-30, 33-35, and 38 are respectfully requested.

[15] *In re Gal*, 25 USPQ 2d 1076, 1078 (Fed. Cir. 1992).
[16] *In re Chu*, 36 USPQ 2d 1089, 1095 (Fed. Cir. 1995).

BACCHI ET AL. IN VIEW OF YOUNG ET AL.

Withdrawal of the rejection of claims 11, 12, 17-19, and 41 under 35 U.S.C. §103(a) as being unpatentable over Bacchi et al. in view of Young et al. (US 5,792,566) is requested. These references are submitted as not being properly combinable and, certainly, at least, the Examiner's stated motivation to combine these references in the manner suggested is facially deficient.

Young et al. is directed to improved commercial single crystal wafers, which have a stress concentration notch that allows cleaving the crystal along a desired cleavage plane. Notch 172, offered by the Official Action as disclosing "the pit", is actually a stress concentration notch formed by longitudinal cut 171. Notch 172 facilitates cleavage of the crystal wafer by concentration of the cleaving forces applied at or near the score line. This cleavage line is cut along the entire length of a single crystal ingot, and is used after sawing the ingot into slices to uniquely define the first and second faces of the wafer.

Applicants submit that Young et al. is directed to the solution of a completely different technical problem than both Bacchi et al. and Applicants' claimed and disclosed invention, and is therefore submitted as not being properly combinable with Bacchi et al. Therefore, the motivation to combine these references is deficient for at least this reason.

Furthermore, the Examiner's stated motivation to combine the references "in order to align/stack the wafers by matching the information mark of pits of wafers", is not grounded in any teaching of the present application, nor in any teaching of Young et al. or Bacchi et al., and is submitted as also being deficient at least for this reason.

Still further, while the Examiner admits that the suggested combination of references fails to teach that the groove is curved on the boule, the Examiner erroneously asserts that "it would have been an obvious design variation well within the ordinary skill in the art...for aligning/stacking the wafer by the matching location of the pits of wafer, and therefore an obvious expedient." Applicants respectfully traverse this erroneous assertion of obvious design choice.

The Federal Circuit, as cited above, in *In re Chu*, precludes a finding of obvious design choice where claimed structure and the function it performs are different from those of the prior art. In applicants' dependent claim 12, for example, the pits are recited as being on the side

surface of the wafer, formed prior to slicing the wafer from the boule by providing diagonal lines in the boule ***to provide a unique pattern on each wafer sliced from the boule.***

The Examiner's statement that the claimed invention is an obvious design variation "by the matching location of the pits of wafer", directly contradicts the above recitation and the function performed by the recited structure, since "matching" the location of the pits does not teach or suggest providing a ***unique pattern*** on each wafer.

Even assuming, *arguendo*, that the references are properly combinable as suggested by the Examiner, a proposition with which applicants strongly disagree for the various reasons discussed above, Young et al. does not make up for the previously identified deficiencies of Bacchi et al., as discussed above with respect to independent claims 1 and 37.

Thus, the applied art, taken alone or in combination, does not teach or suggest all the recited features of independent claims 1 and 37, from which these dependent claim variously and ultimately depend. Reconsideration and allowance of claims 12, 17-19, and 41 are, therefore, respectfully requested.

BACCHI ET AL. IN VIEW OF DUNCAN ET AL. AND YOUNG ET AL.

Withdrawal of the rejection of claims 23-26 under 35 U.S.C. §103(a) as being unpatentable over Bacchi et al. as modified by Duncan et al., in further view of Young et al. is requested.

The Examiner admits that Bacchi et al. and Duncan et al. are deficient with respect to providing a teaching or suggestion of pits being arranged on a back surface of the wafer. The Official Action goes on to assert that Young et al. "teaches the pit (172) is grooved on the side surface of the wafer extending from the front surface of the wafer to a back surface of the wafer when the wafer of Fig. 1 is cut horizontally wherein the pit is perpendicular to a top surface and a bottom surface of the wafer (see Fig. 1-3; col. 2, line 55-col. 4, line 3)." Applicants note that the Examiner has improperly invoked the entirety of the "Detailed Description" of Young et al. in asserting this proffered teaching.

First of all, stress concentration notch 172, disclosed in Young et al. for crystal cleavage purposes, can not fairly be defined as "pits...arranged in the back surface of the wafer", as recited in

dependent claim 23, as could readily be ascertained from and defined by Applicants' disclosure. Even assuming, *arguendo*, that stress concentration notch 172 is a "pit", Young et al. would only disclose a pit on a side surface of the wafer, and does not disclose, in any fair or reasonable manner, pits in a back surface of the wafer, as claimed. By placing pits on a back surface, Applicants' claimed invention, in one embodiment, reduces the effect of semiconductor processing on the pits, and thus helps to improve readability, in conjunction with other recited features.

Further, and as previously discussed above, Duncan et al. and Young et al. are submitted as not being properly combinable with Bacchi et al.

Finally, the motivation to combine the references in the manner suggested by the Examiner is submitted as being deficient. For example, the Examiner incorrectly asserts that it would have been obvious to a person having skill in the art to incorporate the teachings of Young et al. to the teachings of Bacchi et al. and Duncan et al. in order to align/stack the wafers by matching the information mark or pits of wafers located on the back surface of the wafer, and is therefore an obvious expedient. Applicants respectfully traverse this asserted motivation to combine the references in the manner suggested.

One purpose of Applicants' invention is to ensure readability of information patterns on semiconductor wafers before, during, and after processing. "Matching" information marks or pits of wafers located on the back surfaces of the wafers for alignment purposes is not a stated objective of Applicants' claimed invention, nor is this matching function fairly taught or suggested by the reference combination.

Even assuming that the references are properly combinable as suggested by the Examiner, a proposition with which Applicants strongly disagree, neither Duncan et al. nor Young et al. make up for the previously identified deficiencies of Bacchi et al., as discussed above with respect to independent claims 1 and 37.

Thus, the applied art, taken alone or in combination, does not teach or suggest all the recited features of independent claims 1 and 37, from which these dependent claim variously and ultimately depend. Therefore, reconsideration and allowance of dependent claims 23-26 are respectfully requested.

BACCHI ET AL. IN VIEW OF YANO ET AL.

Withdrawal of the rejection of claims 14 and 52 under 35 U.S.C. §103(a) as being unpatentable over Bacchi et al. in view of Yano et al. (US 6,268,641) is requested.

Even assuming that the references are properly combinable as suggested by the Examiner, a proposition with which Applicants do not necessarily agree, Yano et al. does not make up for the previously identified deficiencies of Bacchi et al., as discussed above with respect to the anticipation rejection of independent claims 1 and 51.

Accordingly, since the applied art, taken alone or in combination, does not teach or suggest all the features of Applicants' claimed invention, reconsideration and allowance of claims 14 and 52 are requested.

BACCHI ET AL. IN VIEW OF BROWN ET AL.

Withdrawal of the rejection of claims 15, 36 and 42 under 35 U.S.C. §103(a) as being unpatentable over Bacchi et al. in view of Brown et al. (US 5,976,768) is requested. Applicants submit that these references are only combinable by the use of improper hindsight

The Examiner admits that Bacchi et al. is deficient with respect to providing a teaching or suggestion "that the pits is [sic] coated with silicon ***carbide***" (emphasis added).

The Official Action goes on to suggest that Brown et al. teaches implants 2400 having implants 2408 which are separated by space troughs 2802, and a silicon ***dioxide*** material 3302 which coats and fills the space above the implant and space troughs, asserted as being disclosed by Figs. 31 and 33, and col. 15, line 45-col. 16, line 14.

Although these assertions may be true as far as they go, Applicants point out that Brown et al. is directed to method for forming sidewall spacers using frequency doubling hybrid resist, and a device having such sidewall spacers. Brown et al. is clearly silent as to any disclosure of any information pattern, by pit or otherwise, on any portion of any wafer, and is directed to the solution of a completely different technical problem than either of Bacchi et al. or Applicants disclosed and

claimed invention. Thus, Applicants submit that these references are not properly combinable, at least for these reasons.

Further, Brown et al., teaches that ***the sidewall material is preferably silicon dioxide*** and, in spite of a general statement that the sidewall material could also comprise "any other suitable material", ***Brown et al. completely lacks specific disclosure, as required, that the sidewall material may be either sapphire or silicon carbide***, as specifically claimed in dependent claim 36, for example.

Further, it is impermissible within the framework of 35 U.S.C. §103 to pick and choose from any one reference only so much of it as will support a given position to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one skilled in the art.[17] Further in this regard, As the Court of Customs and Patent Appeals, predecessor to the Federal Circuit, has held:

> All relevant teachings of cited references must be considered in determining what they fairly teach to one having ordinary skill in the art. The relevant portions of a reference include not only those teachings which would suggest particular aspects of an invention to one having ordinary skill in the art, but also those teachings which would lead such a person away from the claimed invention.[18]

The rejections in the Official Action amount, in substance, to nothing more than hindsight reconstruction of (perhaps) only a portion of Applicants' invention by relying on isolated teachings of the applied art, without considering the overall context within which those teachings are presented. Without benefit of Applicants' disclosure, a person having ordinary skill in the art would not know what portions of [Bacchi et al. or Brown et al.] to consider, and what portions to disregard as irrelevant or misleading.[19]

For example, although Brown et al. appears to disclose placing a layer of silicon dioxide sidewall spacer material 3302 over gate-edge lightly doped implant 3102, the claims involved with this particular unpatentability rejection recite, in various forms, providing a coating ***on the***

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[17] *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc.*, 230 USPQ 416 (Fed. Cir. 1986).
[18] *In re Mercier*, 185 USPQ 774, 778 (CCPA 1975).
[19] *In re Wesslau*, 147 USPQ 391, 393 (CCPA 1965).

surface of the pits, preferably a sapphire or silicon carbide coating. While sapphire and silicon carbide are known for their surface hardness, silicon dioxide, on the other hand, is not believed to be known in the art to have a particularly hard surface characteristic.

Even if gate-edge lightly doped implants 3102 can, somehow, under some dubious construct, substitute for "pits", Applicants submit that sidewall spacer material 3302, as disclosed in Brown et al. Figs. 33-34, for example, would absolutely ***prevent*** any information from being read from the asserted "pits". Contrary to the asserted basis for motivation in the Official Action, the disclosed arrangement of Brown et al. does not allow for "clear reading of the pits since the coating of the wafer surface prevent dust materials from resting within the pits...." Clearly, dust particles could not "rest" in the pits, because there are no "pits" in Brown et al. for dust to settle in, as the sidewall spacer silicon dioxide material is seen to completely fill sidewall spacer troughs 2802.

Further, Even assuming that the references are properly combinable as suggested by the Examiner, the applied art, taken alone or in combination, does not teach or suggest all the recited features of independent claims 1 and 37, from which dependent claims 15, 36 and 42 variously and ultimately depend.

Accordingly, as the references are not properly combinable, and even if properly combinable under some theory, the applied art does not teach or suggest all the recited claim features. Accordingly, reconsideration and allowance of claims 15, 36 and 42 are requested.

BACCHI ET AL. IN VIEW OF IWAI

Withdrawal of the rejection of claims 20, 31, 32 and 39 under 35 U.S.C. §103(a) as being unpatentable over Bacchi et al. in view of Iwai (US 4,418,567) is requested.

The Examiner admits that Bacchi et al. is deficient with respect to providing a teaching or suggestion "that the pits having [sic] a location reference information."

Iwai is directed to a method for manufacturing a semiconductor device having alignment or information marks on a side surface thereof. Based upon the disclosure of Iwai, the information mark may be letters or numerals, or "other characters such as hiraganas, katakanas, and Greek

letters, or symbols such as bar patterns." Iwai does not teach or suggest use of a ***digital*** information pattern other than a bar code pattern.

Even assuming that the references are properly combinable in the manner suggested by the Examiner, the applied art, neither alone nor in combination, teaches or suggests all the recited features of independent claims 1 and 37, from which these claims variously and ultimately depend.

Accordingly, reconsideration and allowance of claims 20, 31, 32 and 39 are respectfully requested.

BACCHI ET AL. IN VIEW OF MAKINOUCHI ET AL.

Withdrawal of the rejection of claim 53 under 35 U.S.C. §103(a) as being unpatentable over Bacchi et al. in view of Makinouchi et al. (US 4,958,082) is requested.

The Examiner admits that Bacchi et al. is deficient with respect to providing a teaching or suggestion "that the reading device comprises an interferometer."

Further, as previously discussed, Bacchi et al. clearly does not disclose a system for encoding information on a semiconductor wafer and reading the information, wherein the system includes, among other features, "...a plurality of pits formed...in a digital information-providing pattern...[which] is adapted and arranged to be readable before, during and after completion of processing on the wafer...", as recited in independent claim 51.

Even assuming, *arguendo*, that the references are properly combinable in the manner suggested by the Examiner, Makinouchi et al. does not make up for the previously identified deficiency of Bacchi et al., discussed above.

Accordingly, reconsideration and allowance of claim 53 are respectfully requested.

BACCHI ET AL. IN VIEW OF MOH ET AL.

Withdrawal of the rejection of claims 46-50 under 35 U.S.C. §103(a) as being unpatentable over Bacchi et al. in view of Moh et al. (US 6,214,250) is requested.

The Examiner admits that Bacchi et al. is deficient with respect to providing a teaching or suggestion that the pits are altered and invalidated.

Moh et al. is directed to a multilayer, temperature resistant composite label suitable for labeling a substrate, and which preferably includes a ceramic composite and a fired ceramic body having a base layer that includes a glassy phase and a refractory phase, wherein the glassy phase is capable of wetting a substrate at an application temperature. This arrangement is disclosed as providing sufficient color contrast between the top layer an the fired ceramic body such that a code pattern, e.g., a bar code pattern, is optically discernible.

Applicants submit that Moh et al., being directed to the solution of a completely different technical problem than Applicants' disclosed and claimed invention, and also completely different from the problem solved by the scribe reader of Bacchi et al., is therefore not properly combinable with Bacchi et al.

Even assuming that the references are properly combinable as suggested by the Examiner, a proposition with which Applicants strongly disagree, the applied art, taken alone or in combination, do not teach or suggest all the claimed features of independent method claim 37, from which these claims depend.

Accordingly, reconsideration and allowance of dependent claims 46-50 are respectfully requested.

BACCHI ET AL. IN VIEW OF MOH ET AL. AND HUANG ET AL.

Withdrawal of the rejection of claims 3-5 under 35 U.S.C. §103(a) as being unpatentable over Bacchi et al. in view of Moh et al. and Huang et al. (US 5,330,924) is requested.

The Examiner admits that Bacchi et al. and Moh et al. are deficient with respect to providing a teaching or suggestion that the pits are arranged in an ion implant region to provide a contrast. The Examiner goes on to offer Huang et al. as disclosing ion implantation being used to "characterize" the wafer. Applicants respectfully traverse this assertion, and also point out that the reference combination is not properly combinable, as discussed below.

Huang et al. is directed to a method of making a 0.6 μm word line pitch ROM cell by 0.6 μm technology. The structure resulting from the method of Huang et al. has closely-spaced, self-aligned conductive lines that can be used as word lines for the ROM device.

The Official Action incorrectly interprets the statement in Huang et al. that "[o]nly a single implant is required to characterize the ROM circuit. The characterization is achieved by an ion implant of boron B11 at an energy of between about 130 and 250 keV and a dosage of between about 5 E13 and 5 E14 atoms/cm_2."[20] The Examiner appears to confuse the term "characterize the ROM circuit" with the recited "...wherein the pits are arranged in a region...[and] the contrast is provided by ion implant in the region", as claimed in dependent claim 3.

Applicants submit that there is no reasonable connection or inference to be drawn between "characterizing" the ROM of Huang et al. by ion implantation to "pre-configure" the digital information desired in the ROM, e.g., "01101110", or other digital sequence, and using Applicants' recited ion implantation to improve optical contrast and, hence, readability of Applicants' pits, which are arranged in an information-providing pattern other than a bar code pattern. There is no teaching or suggestion in Huang et al. of an information providing pattern, as understood and known by persons having skill in the art, in light of Applicants' disclosure, and there is certainly no teaching or suggestion of the use of contrast, or contrast enhancement.

Further, Applicants submit that Huang et al. and Bacchi et al. are directed to the solution of different technical problems, different still from the technical problem solved by Applicants' claimed invention, and are, at least on this basis, not properly combinable.

The Examiner's stated motivation to combine the references in the manner suggested, i.e., that "...[i]t would have been obvious to one of ordinary skill...to substitute the well-known method of ion implant as taught by Huang with the method of composite label as taught by Bacchi as modified by Moh in order ***to provide the conductance to wafer***, and therefore an obvious expedient" (emphasis added)[21], is not clearly set forth, and does not seem to appreciate that, at least in Applicants' claimed invention, conductive properties of an ion implant, if any, are not relied

[20] *See* Huang et al. at col. 4, lines 44-49.
[21] *See* Official Action, ¶ 15, on page 12.

upon. Instead, optical characteristics affecting contrast and readability of the pits are relied upon, at least in some claimed embodiments.

Even assuming that the references are properly combinable as suggested by the Examiner, a proposition with which Applicants specifically and strongly disagree, the applied art, taken alone or in combination, does not teach or suggest all the claimed features of independent claim 1, as discussed previously with respect to the anticipation rejection of claim 1.

Accordingly, reconsideration and allowance of claims 3-5 are requested.

BACCHI ET AL. IN VIEW OF WEN

Withdrawal of the rejection of claim 59 under 35 U.S.C. §103(a) as being unpatentable over Bacchi et al. in view of Wen (US 5,834,819) is requested. The dependency of claim 59 has been corrected from claim 1, to claim 58, to ensure proper antecedent basis is provided.

The Examiner admits that Bacchi et al. is deficient with respect to providing a teaching or suggestion that the pattern of pits is a quaternary-coded pattern having at least three shapes. The Examiner goes on to offer Wen as disclosing using a quaternary code to encode the data. While Wen clearly uses quaternary coding, this is irrelevant to the claimed invention, and Applicants further respectfully traverse the assertion that the reference combination is properly combinable, as discussed below.

On its face, Wen is not properly combinable with Bacchi et al. Wen is directed to a semiconductor read-only memory device for permanent storage of multi-level coded data, preferably using quaternary-coded data with four different values of data. Wen in no way, provides a teaching or suggestion of providing a solution to providing information patterns on a semiconductor wafer, and likewise does not disclose, teach or suggest a "pattern", much less a quaternary-coded "pattern", as recited in dependent claim 59.

It appears that the Examiner may have lost sight of Applicants' claimed and disclosed invention which, in no way, relates to a ROM device. Wen is a multi-level memory device, which stores multi-level data by manipulation of threshold voltages, and is not, in any way, involved with providing an information providing pattern in the form of the claimed pits having different shapes.

As Wen solves a completely different technical problem in a completely different way than both Bacchi et al. and Applicants' claimed invention, Wen is submitted as not being properly combinable with Bacchi et al. at least on that basis.

Even assuming that the references are properly combinable as suggested by the Examiner, a proposition with which Applicants strongly disagree, Wen does not make up for the previously identified deficiencies of Bacchi et al., as discussed with respect to the anticipation rejection of independent claim 1.

Accordingly, as the applied art, taken alone or in combination, does not teach or suggest all the claimed features, reconsideration and allowance of claim 59 are requested.

BACCHI ET AL. IN VIEW OF ZHANG

Withdrawal of the rejection of claims 56 and 61 under 35 U.S.C. §103(a) as being unpatentable over Bacchi et al. in view of Zhang (US 5,245,165) is requested.

The Official Action acknowledges that Bacchi et al. is deficient in providing a teaching or suggestion that the pattern of pits comprises at least three shapes, and offers Zhang as disclosing a glyph code having at least three different shapes.

Zhang is submitted as not being properly combinable with Bacchi et al. Zhang is directed to a self-clocking glyph code for encoding dual bit digital information on hardcopy recording media, as an interface technology for seamlessly integrating hardcopy documents and computer controlled electronic document processing systems. The self-clocking feature of the glyph codes is embedded in the spatial distribution of the logically ordered glyphs, and this feature increases the tolerance to the degradation, i.e., image distortion and background noise, that these codes might encounter when they are reproduced by photocopying and/or facsimile transmission.

Zhang has no connection with a semiconductor wafer, or with a method for encoding information on a semiconductor wafer, as in Applicants' claimed invention. Thus, as Zhang is directed to a completely unrelated technical problem than that solved by either of Bacchi et al. or Applicants' claimed invention, Zhang is submitted as not being combinable with Bacchi et al., at least on that basis.

Even assuming that the references are properly combinable as suggested by the Examiner, an assertion with which Applicants strongly disagree, Zhang does not make up for the previously identified deficiency of Bacchi et al., at least with respect to independent claims 1 and 37, as discussed above with respect to the anticipation rejection of these claims.

Accordingly, as the applied art, taken alone or in combination, does not teach or suggest all the claimed features, reconsideration and allowance of claims 56 and 61 are requested.

BACCHI ET AL. IN VIEW OF GRANDIA ET AL.

Withdrawal of the rejection of claims 65-67 under 35 U.S.C. §103(a) as being unpatentable over Bacchi et al. in view of Grandia et al. (US 4,084354) is requested.

The Official Action acknowledges that Bacchi et al. is deficient in providing a teaching or suggestion that the wafer boule has a sequence start notch along a diagonal surface of boule and a helically shaped sequence notches along a longitudinal surface of the boule.

Grandia et al. is directed to a process for slicing boules of single crystal material, in particular, a process for slicing hard single crystal materials such as gadolinium gallium garnet (GGG), which have application in magnetic bubble domain technology.

Whether or not Grandia et al. discloses that for which it is offered by the Official Action, Grandia et al. still does not make up for the deficiencies of Bacchi et al., as discussed with respect to the anticipation rejection of independent claims 1 and 37.

Accordingly, as the applied art, taken alone or in combination, does not teach or suggest all the claimed features, reconsideration and allowance of claims 65-67 are requested.

Allowable Subject Matter

Applicants note with appreciation the indication that claims 57 and 62 are drawn to patentable subject matter, and would be allowed if rewritten in independent form. In reliance upon the indication of allowable subject matter, claims 57 and 62 have been written in independent form. Allowance of these claims is requested.

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Docket No.: 21806-00085-US

In view of the above, each of the presently pending claims 1-67 in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

The Examiner is respectfully requested to enter this Amendment After Final, in that it raises no new issues, but merely places the claims in a form more clearly patentable over the references of record. In the alternative, the Examiner is respectfully requested to enter this Amendment After Final in that it reduces the issues for appeal.

In the event that the Examiner believes that an interview would serve to resolve any remaining issues, the undersigned is available at the telephone number indicated.

Although extensions of time are not necessary with this communication, the Director is hereby authorized to any extension fees, to CBLH Deposit Account No. 22-0185. The Director is authorized to charge any fees for excess claims, or credit any overpayment, associated with this communication to IBM Deposit Account No. 09-045.

Respectfully submitted,

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Enclosure: Claims after Amendment

Application No.: 09/527,761 Docket No.: 21806-00085-US

Claims after Amendment

IN THE CLAIMS:

Please amend claims 1, 37, 51, 57, 59, and 62 as follows:

1. (Twice Amended) A semiconductor wafer, comprising:

a plurality of pits in the semiconductor wafer, the pits being arranged in a digital information-providing pattern,

said digital information-providing pattern being arranged in a pattern other than a bar code pattern,

said digital information-providing pattern being arranged and suitably adapted to be ~~which is~~ readable before, during and after completion of processing on the wafer.

37. (Twice Amended) A method of encoding information on a semiconductor wafer, comprising:

converting the information into a digital form,

said digital form being a form other ~~that~~ than a bar code pattern; and

forming pits ~~readable~~ suitable for being read before, during and after completion of processing on the wafer corresponding to the digital form of the information in the semiconductor wafer.

51. (Twice Amended) A system for encoding information on a semiconductor wafer and reading the information, the system comprising:

a plurality of pits formed on the semiconductor wafer in a digital information-providing pattern, said digital information-providing pattern being a pattern other than a bar code pattern,

wherein the digital information-providing pattern is adapted and arranged to be readable before, during and after completion of processing on the wafer; and

means for reading the information encoded by the pits.

57. (Amended) A semiconductor wafer, comprising:

a plurality of pits in the semiconductor wafer, the pits being arranged in a digital information-providing pattern,

said digital information-providing pattern being other than a bar code pattern,

said digital information-providing pattern being readable before, during and after completion of processing on the wafer~~The semiconductor wafer according to claim 56~~,

wherein the digital information-providing pattern is a non-binary coded pattern, and the plurality of pits comprise pits having at least three different shapes, and

wherein the at least three different shapes include a circle, an oval, and a rectangle.

59. (Amended) The semiconductor wafer according to claim ~~1~~58, wherein the non-binary coded pattern is a quaternary-coded pattern.

62. (Amended) A method of encoding information on a semiconductor wafer, comprising:

converting the information into a digital form, said digital form being a form other than a bar code pattern; and

forming pits readable before, during and after completion of processing on the wafer corresponding to the digital form of the information in the semiconductor wafer~~The system of claim 37~~,

wherein said step of forming pits includes forming pits in the shape of a circle, an oval, and a rectangle.